

Rhode Island Department of Environmental Management

To: Interested Parties

Date: January 2004

Subject: **Innovative or Alternative ISDS Technologies**

Attached herewith is the official “List” of Approved Innovative/Alternative (I/A) Technologies for onsite wastewater disposal. These technologies have been approved pursuant to RIDEM procedures and regulation promulgated in 1996. The technologies have been reviewed and accepted by a nine member Technical Review Committee composed of representatives of local government, the University of Rhode Island, CRMC, environmental organizations, and the private sector. A total of thirty one applications have been received to date, Twenty of which have been approved and are now on the approved list. The list will be updated periodically.

Also available is a brief summary of the I/A technology application process and a fact sheet entitled "Guidance to ISDS Designers" that provides additional information for designers who are contemplating the use of an approved I/A technology.

Should you have any question or need further information, please contact Peter O'Rourke at the ISDS Program Office at 401-222-6820 x 7714.

Rhode Island Department of Environmental Management

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INNOVATIVE/ALTERNATIVE INDIVIDUAL SEWAGE DISPOSAL SYSTEMS (ISDS) TECHNOLOGY PROGRAM

The June 1996 Amendments to DEM's Individual Sewage Disposal Systems (ISDS) Rules and Regulations provide the basis for approval of Innovative/Alternative (I/A) Technologies in Rhode Island. I/A systems are designed as alternatives to conventional ISDS systems or parts of a conventional system. A conventional system is a traditional ISDS with a septic tank, pump chamber with pump or siphon (if needed), distribution box and a standard leach field with gravity distribution. An Innovative/Alternative System or Technology is an ISDS system that does not meet the location, design or construction requirements of a conventional system, but has been demonstrated through field testing, calculations and other engineering evaluations to provide the same degree (or better) of environmental and public health protection.

The June 1996 Amendments established three different categories of I/A technologies: alternative systems, system components, and experimental systems.

Alternative Systems - This category has two classes of certification: Class I and Class II. An I/A system that is certified as Class I has been shown to have at least five consecutive years of quality performance data which clearly demonstrate that all applicable standards have been met. A Class I system must also have been approved for at least five consecutive years in Rhode Island or at least three other jurisdictions. A Class II certification is issued to technologies that have at least 2 years of performance data, have demonstrated a theory or applied research, and have been approved in Rhode Island or another jurisdiction for at least 2 consecutive years.

System Components - This category also has two classes of certification: Class I and Class II. A system component that is certified as Class I has been shown to have at least two consecutive years of performance data and has been approved for at least two consecutive years in Rhode Island or at least three other jurisdictions. Class II certification is issued to components that provide one to two years of performance data, demonstrate a theory or applied research, have been approved for use in at least one other jurisdiction, and have performed successfully for a minimum of one year.

Experimental Systems - This category is designed to allow innovative systems, that have been demonstrated to work in practice or theory, to be installed on a limited basis as they are further tested and studied. Between three and ten systems must be installed on approved sites where both the property owner and subsequent purchasers agree to abandon the experimental system and install a conventional or I/A approved Class I system if the experimental system fails to perform as designed. For a technology or component to be approved for use in the state of Rhode Island, the Vendor of that technology must submit an application package to the Department's Innovative/Alternative Technology Program for review. The application package is then reviewed by Department staff for completeness. Completed applications are forwarded to the Department's ISDS Technical Review Committee (TRC). The TRC is made up of

members from the Department, Coastal Resource Management Council, local Universities, ISDS design and installation firms, local municipalities, and environmental organizations. The TRC reviews all I/A applications and makes recommendations to the Department based on their findings. The Department then issues the final approval or denial.

An approval is documented in the form of a Certification which is signed by the Chief of the Permitting Section in the Office of Water Resources. The Certification lists any design, maintenance or installation requirements or restrictions placed on the technology and it also indicates the general requirements and any sampling and reporting requirements associated with the technology.

After a technology is certified by the Department, the Vendor must submit a Design and Installation Manual for review. When the technology's Design and Installation Manual is approved the technology is then placed on the Department's List of Approved Innovative/Alternative Technologies. Once an innovative or alternative technology is on the list then individual applications to design, construct, alter, or install these technologies may be submitted to the Department. Please note that an I/A technology is not approved for use under the program until placed on the list. Individual ISDS applications submitted to the Department proposing a technology not yet listed as of the date of receipt of the application must be submitted through the variance process.

List of Approved Innovative/Alternative ISDS

Leachfield Systems:

Technology Name: **Eljen In-Drain, Type B**

Vendor Information: Eljen Corporation
James Donlin
15 Westwood Road
Storrs, CT 06268
(800) 444-1359

Certification: Alternative System or Technology - Class I

Technology Type: Alternative Leach Field

Description: The Eljen In-Drain is designed to replace the gravel/stone media of a conventional trench leach field. In-Drains are constructed of a cusped plastic core that is completely enveloped by a geotextile fabric that is folded accordion style over and under the plastic core. Each In-Drain unit is 3 feet wide, 4 feet long, and 7 inches high, and is designed to be installed in a trench with a minimum of 6 inches of concrete sand bedding beneath and along the sidewalls of the units. Eljen In-Drains have been assigned the following sizing criteria: one linear foot of In-Drain is equivalent to 7 square feet of required leach field area.

Technology Name: **Bottomless sand filter**

Vendor Information: Generic

Certification: None: See Department guidance document issued November 2001

Technology type: Alternative Leach field

Description: An equal or superior leach field for pretreated effluent which is applied under pressure to a 2' bed of specified sand media. The effluent is pumped to and distributed by SCH 40 PVC or equivalent surrounded by a minimum of 6" of peastone. Wastewater trickles down in unsaturated thin-film flow through sand media in a time dosed mode. After treatment the effluent is disposed directly under the sand filter. The technology is targeted for single family sized systems where soil and site conditions exist that make the use of conventional or shallow narrow drain fields impractical or not economical.

Technology Name: **Cultec Contactor Chambers Models 75, 100, 125 & Field Drain Panels (C-1, C-2, C-3 & C-4)**

Vendor Information: Cultec, Inc.
878 Federal Road
Brookfield, CT 06804
(800) 4-CULTEC

Certification: Component Technology - Class I Component

Technology Type: Alternative Leach Field Component

Description: The System consists of high-density polyethylene arch-shaped chambers that have holes along the sidewall of the lower portion of the units. Three models of Contactor Chambers (models 175, 100 and 125) and four Field Drain Panel configurations (C-1, C-2, C-3, C-4) have been approved. The system is installed with 1 ft. of stone beneath the chambers and additional stone filling the sidewall space between the trench wall and the chamber. Trench width and depth varies with the model of the system, see the RIDEM issued Cultec Certification for more details. These chambers shall be sized based on DEM's approval and designed in accordance with DEM regulations for shallow leaching chambers (flow diffusers) SD 13.02.

Technology Name: Double-Wide Standard and High Capacity Infiltrator Chambers

Vendor Information: Infiltrator Systems
Judd Efinger
4 Business Park Road
P.O. Box 768
Old Saybrook, CT 06475
(800) 221-4436

Certification: Component Technology - Class I

Technology Type: Alternative Leach Field Component

Description: The Infiltrator Chambers are arch-shaped high density polyethylene chambers with a nominal width of 2.83 ft. and a length of 6.25 ft. with a ¼ inch high horizontal slots along the sidewall on the lower half of the units. The Standard Chamber is 12 inches high and the High Capacity Chamber is 16 inches high. The system is installed in a 6 ft. wide trench with 1 ft. of stone beneath the chambers and additional stone filling the sidewall space between the trench wall and the chamber. These chambers shall be sized based on DEM's approval and designed in accordance with DEM regulations for shallow leaching chambers (flow diffusers) SD 13.02.

Filters Components:

Technology Name: **Zoeller Effluent Filters**

Vendor Information: Zoeller Pump Co.
3469 Cane Run Road
Louisville, KY 40211
(800) 928 7867

Certification: Component Technology Class I

Description: The technologies includes a mode series of pumps in screened Vaults designed for installation at the outlet of a septic tank to prevent solids passing to the leachfield. There is also approval for a commercial septic tank effluent filter to prevent solids carryover.

Technology Name: **Zabel A-1800, A-100, A-300 Residential and Commercial**
Wastewater Filters

Vendor Information: Zabel Environmental Technology
10409 Watterson Trail
Jefferson, KY 40299
(800) 221-5742

Certification: Component Technology - Class I

Technology Type: Effluent Filter

Description: The Zabel filters are PVC wastewater effluent filters designed to be installed at the outlet of a septic tank to prevent solids from passing to the drain field.

Technology Name: **GAG SIM/TECH Filter**

Vendor Information: Gary Koteskey, President
SIM/TECH Filter
06598 Horton Bay North Rd
Boyne City, MI 49712
616-582-7327

Certification: Component Technology - Class I

Technology Type: Pump effluent filter for use with pressure distribution system

Description: The SIM/TECH filter is 3 inches in diameter, 18 inches in length, made of schedule 40PVC (or ABS) and stainless steel containing 1/16 inch holes with a total open area of 69.52 sq. in. (41%). It is placed on the discharge side of a pump and lessens clogging of small diameter holes of pressure distribution piping.

Technology Name: **OSI Screened Pump Vaults and Effluent Filters**

Vaults: OSI200, SV1500, and SVT Series

Filters: F, FE, FT, and FTI Series

Vendor Information: Orenco Systems, Inc. (OSI)
814 Airway Avenue
Sutherlin, OR 97479-9012
(514) 459-4449

Regional Contacts: David Cotton
Wastewater Technologies, Inc
P.O. Box 80
Saxtons River, VT 05154-0080
((802) 869-3219

Atlantic solutions
2417 East Main Rd.
Portsmouth, R.I. 02871
401-293-0176

Certification: Component Technology - Class I

Technology Type: Effluent Filter and Pump Vault Filter

Description: The OSI screened pump vault is installed at the outlet end of a single or double compartment septic tank. The screened vault captures solids so that only liquid from the “clear zone” between the tank’s scum and sludge layers is pumped. The OSI effluent filter is a polyethylene wastewater filter installed at the outlet of a septic tank to prevent solids from passing to the drain field.

Technology Name: **Polylok PL-122 Effluent Filter:**

Vendor Information: Polylok, Inc.
173 Church Street
Yalesville, CT 06492
(800) 234-3119

Certification: Component Technology - Class I

Technology Type: Effluent Filter

Description: The Polylok PL-122 is a wastewater effluent filter designed for installation at the outlet of a septic tank to minimize solids from passing to the drain field. The PL-122 contains 122 linear feet of 1/16th-inch slots and is equipped with a Buoyant shut off ball that stops the flow of unfiltered effluent when the filter is removed for maintenance. This filter is modular, allowing the user to increase the filtration area by snapping two or more filters together.

Distribution Components:

Technology Name: **Polylok PL- Dipper Box**

Vendor Information: Polylok, Inc.
 173 Church Street
 Yalesville, CT 06492
 (800) 234-3119

Certification: Component Technology - Class II

Technology Type: Distribution Box

Description: The Polylok Dipper Box is a leach field dosing mechanism designed on the pivot and balance principal. The Dipper Box is comprised of a specially designed concrete distribution box with dipper tray assembly. The dipper storage tray gradually collects effluent from the septic tank. When it has retained 1.5 gallons of effluent it automatically discharges effluent equally to each leachfield trench.

Technology Name: **Zoeller Tru-Flow D-Box**

Vendor Information: Zoeller Pump Co.
 P.O. Box 16347
 Louisville, KY 40256-0347

Certification: Component technology – ClassII

Technology Type: Distribution Box

Description: The unit is comprised of a diverter basin and a diverter assembly to evenly split flow to five outlet lines by adjusting a bubble level and adjustment screw in the event of uneven settling.

Aerobic Treatment Systems:

Technology Name: **Bioclere**

Vendor Information: AWT Environmental, Inc.
John Lafreniere or Craig Lindell
241 Duchaime Blvd.
New Bedford, MA 02745
(508) 998-7577

Certification: Alternative System or Technology - Class II

Technology Type: Aerobic Wastewater Treatment System

Description: The Bioclere system is essentially a modified trickling filter positioned over a clarifier. Effluent from the septic tank enters Bioclere and is pumped up to the top of the insulated unit where it is evenly distributed over the surface of the filter media. Biochemical oxidation takes place as the water trickles through the filter and over the biological film that grows on the surface of these randomly packed pieces of PVC plastic. Oxygen is supplied to the system through a small axial fan located in the top of the housing. The system is capable of significantly reducing biological oxygen demand (BOD₅) and total suspended solids (TSS) in the effluent. Based on these reductions, the Department has allowed for a 35% reduction in leach field size.

Technology Name: **Chromoglass SBR**

Vendor Information: Cromoglass Corporation
2902 N. Reach Road
P.O.Box 3215
Williamsport, PA. 17701

Certification: Alternative system or Technology-Class II

Technology Type: Sequencing batch reactor

Description: The sequencing batch reactor (SBR) process is a sequential suspended growth (activated sludge) process in which all the major steps occur in the same tank in a continuous flow. The three compartment tank provides for solids retention, aeration and sludge storage, and clarification and sludge return. Pumps are use for aeration, mixing, sludge return, and discharge to a leach field. Based on the reduction of BOD and TSS a 45% reduction is allowed in leachfield size.

Technology Name: **SeptiTech M series**

Vendor Information: SeptiTech Inc.
220LewistonRoad
Gary, Maine 04039
(207) 657 5252

Certification: Alternative System or Technology Class II

Technology Type: Recirculating Biological Trickling Filter

Description: The mixed liquor process repeatedly passes the effluent over water repellant Styrofoam beads which entrains the Microbes in the wastewater as it flows through the media. It is designed to be installed after a Septic tank a second tank houses the system

Technology Name: **Biocycle 525**

Vendor Information: Biocycle, Inc.
61 Pilsudski Street
P.O. Box 29496
Providence, RI 02909
(401) 944-4000

Certification: Alternative System or Technology - Class II

Technology Type: Aerobic Wastewater Treatment System

Description: The Biocycle system is an aerobic wastewater treatment system which is designed based on activated sludge and extended aeration principles. It utilizes a three stage treatment process which includes an anaerobic and aerobic treatment, followed by clarification. The system also incorporates an automatic sludge return via venturi from the clarifier to the primary chamber. The system is capable of significantly reducing biological oxygen demand (BOD₅) and total suspended solids (TSS) in the effluent. Based on these reductions, the Department has allowed for a 40% reduction in leach field size.

Technology Name: **Norweco Singulair**

Vendor Information: Seigmund Environmental Services, Inc.
Laszlo and Hollister Siegmund
49 Pavilion Avenue
Providence, RI 02905
(401) 785-0130

Certification: Alternative System or Technology - Class I

Technology Type: Aerobic Wastewater Treatment System

Description: The Singulair Wastewater Treatment System utilizes primary treatment (settling), mechanical aeration, clarification and flow equalization to achieve treatment. The effluent passes from a primary settling chamber to an aeration (with oxygen) chamber through a transfer port. An aspirator at the bottom of a shaft disperses air radially into the aeration chamber as fine bubbles, providing oxygen for the biomass and vertical mixing of the chamber contents. The effluent in the aeration chamber then passes through to the clarification chamber for final settling of solids. All clarified wastewater passes through an effluent filter as it exits the system and is then gravity fed to the leach field. The system is capable of significantly reducing biological oxygen demand (BOD₅) and total suspended solids (TSS) in the effluent. Based on these reductions, the Department has allowed for a 35% reduction in leach field size.

Nitrogen Removal Systems:

Technology Name: **Advantex RX 30**

Vendor information: Orenco Systems inc. (OSI)
814 Airway Avenue
Sutherlin, OR 97479-9012
(514) 459 4449

Certification: Alternative System or Technology – Class II

Technology type: Nitrogen – Reducing Treatment system

Description: In a recirculation process (modes 3a or 3b) effluent is pumped to a prepackaged packed bed filter of fibrous textile media inside a watertight container from a two compartment tank prior to discharge to a leachfield. The system significantly reduces BOD, TSS, and Nitrogen and a 50% reduction in leach field size is allowed.

Technology Name: **RUCK**

Vendor Information: Mr. Joseph Frisella
Frisella Engineering
23 Arnold Street
Wakefield, RI 02879-3796
(401) 783-5949

Certification: Alternative System or Technology - Class II

Technology Type: Nitrogen-Reducing Treatment System

Description: The System is designed as a nitrogen-reducing ISDS. A household's blackwater (toilet & kitchen sink wastewater) is plumbed separately from the greywater (all other wastewater, i.e. shower, laundry & bathroom sink). The blackwater enters a blackwater septic tank followed by a buried, aerobic sand filter. The greywater is plumbed to a greywater septic tank. The nitrified blackwater from the sand filter either is pumped or flows into the greywater septic tank for the denitrification process which occurs under anaerobic conditions with the greywater serving as a carbon source. This system is a single pass-through system. The system is capable of significantly reducing biological oxygen demand (BOD₅) total suspended solids (TSS) and total nitrogen (TN) in the effluent. Based on these reductions, the Department has allowed for a 30% reduction in leach field size.

Technology Name: **Single Home and Modular FAST**

Vendor Information:	Bio-Microbics, Inc. Robert Rebori 8271 Melrose Drive Lenexa, KS 66412 (913) 492-0707	Regional Contact: Jim Dunlap, J&R Engineering 534 New State Highway Raynham, MA 02767 (508) 823-9566
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Certification: Alternative System or Technology - Class II

Technology Type: Nitrogen-reducing and Aerobic Wastewater Treatment System

Description: The FAST (Fixed Activated Sludge Treatment) system is an aerobic wastewater treatment system that utilizes an aerobic fixed film process that is a combination of the conventional trickling filter and activated sludge processes. The FAST system is designed to be installed within a two-compartment tank where the first compartment provides a primary settling zone for incoming sewage and the second houses the actual FAST system. The system contains submerged media that provide surfaces for microbial growth. Aeration and circulation are provided by a blower that pumps air into a draft tube that extends down the center of the tank. The system is capable of significantly reducing biological oxygen demand (BOD₅), total suspended solids (TSS), and total nitrogen in the effluent. Based on these reductions, the Department has allowed for a 45% reduction in leach field size.

Technology Name: **Recirculating Sand Filter**

Vendor Information: Generic

Certification: None: See Department issued guidance document – April 2000

Technology Type: Nitrogen Reducing Treatment System

Description: Wastewater, having received primary treatment in a septic tank or equivalent unit, flows by gravity to a recirculation (mixing) tank. In doses controlled by both a programmable timer and float switch, the mixed fresh wastewater and partially treated filter effluent is applied to a bed of coarse sand (fine gravel) media. This mixed wastewater is dispersed over the filter surface in a PVC distribution network surrounded in pea stone. Wastewater trickles down through the sand media, where biological treatment occurs. The treated effluent is collected in an underdrain at the bottom of the filter and discharged back to the recirculation tank. There most of it mixes with incoming wastewater, a small amount gets discharged to the drainfield, and the cycle begins again. Typically, a buoyant-ball check valve is used to control discharge and recirculation. Treated wastewater is discharged to a drainfield for additional treatment. The system is capable of significantly reducing biological oxygen demand (BOD₅), total suspended solids (TSS), and total nitrogen in the effluent. The technology is targeted for use in critical resource areas and is intended to be used with shallow pressurized drainfields.

Advanced Wastewater Treatment Systems:

Technology Name: **Advantex AX20, AX100.**

Vendor Information: Orenco Systems Inc. (OSI)
814 Airway Avenue
Sutherlin, OR 97479-9012
(514) 459 4449

Certification: Alternative System or Technology - Class I

Technology Type: Advanced Treatment System

Description: A prepackaged packed bed filter that significantly reduces BOD and TSS inside a water proof container installed after a two compartment tank prior to discharge to a leachfield which may be reduced in size by 50%. Unlike the RX series it is not a nitrogen reducing approved system.

Technology Name: **Puraflo® Peat Biofilter**

Vendor Information: Greg O'Donnell
Bord na Mona Environmental Products US, Inc.
P.O. Box 77457
Greensboro, NC 27417
800-PURAFLO

Certification: Alternative System or Technology - Class II

Technology Type: Advanced Treatment System

Description: The Puraflo is a modular pre-engineered biofiltration system that utilizes natural peat fiber as a biofilm media. Among the processes occurring are filtration, absorption, adsorption, ion exchange, and microbial assimilation. Primarily used in single pass mode. The system is capable of significantly reducing biological oxygen demand (BOD₅), and total suspended solids (TSS). Ammonia and pathogens reductions may also be achieved. The technology is targeted for use in critical resource areas and may be used with shallow pressurized drainfields.

Technology Name: **Single Pass Sand Filter**

Vendor Information: Generic

Certification: None: See Department issued guidance document - April 2000

Technology Type: Advanced Treatment System

Description: Wastewater, having received primary treatment in a septic tank or equivalent unit, is pressure dosed to a bed of specified sand media. Wastewater applications to the filter surface are controlled by both a programmable timer and float switch. Wastewater is dispersed over the sand filter surface in a PVC pipe distribution network surrounded in pea stone. Wastewater trickles down in unsaturated thin film-flow through the sand media, where biological treatment occurs. The treated wastewater (sand filter effluent) is collected in an underdrain at the bottom of the filter and discharged by pressure to a shallow - narrow drainfield, where additional treatment occurs. The system is capable of significantly reducing biological oxygen demand (BOD₅), and total suspended solids (TSS).

Ammonia and pathogens reductions may also be achieved. The technology is targeted for use in critical resource areas and is intended to be used with shallow pressurized drainfields.

NOTE: Two (2) new applications are currently under review

1. Infiltrator
2. Amphidrome